

Application No. 10/810,089
Amendment dated NOVEMBER 22, 2005
Reply to Final Office Action dated September 23, 2005

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (original) A balloon catheter comprising:
an elongated shaft including a distal portion and defining at least one lumen;
an expandable member affixed to the distal portion of the elongated shaft such that a section of the elongated shaft extends through at least a portion of the expandable member; and
a radiopaque coating disposed on a surface of a portion of the elongated shaft, the radiopaque coating comprising a radiopaque material disposed within a non-metallic coating material that is applied to the surface of the segment of the shaft in a fluid state and cured.
2. (original) The catheter of claim 1, wherein the radiopaque coating is disposed adjacent the expandable member
3. (original) The catheter of claim 1, wherein the non-metallic coating material comprises paint, lacquer, varnish, shellac, or resin.
4. (original) The catheter of claim 1, wherein the non-metallic coating material comprises non-metallic polymer coating material loaded with the radiopaque material.
5. (original) The catheter of claim 1, wherein the non-metallic coating material comprises a coating material that can be cured through photoinitiated polymerization.
6. (withdrawn) The catheter of claim 1, wherein the radiopaque coating provides one or more raised portions that extend radially from the outer surface of the elongated shaft to provide one or more mounting structures for use in mounting a stent to the catheter.

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7. (original) The catheter of claim 1, wherein the radiopaque coating extends through at least a portion of the expandable member.

8. (original) The catheter of claim 1, wherein the entire radiopaque coating is disposed within the expandable member.

9. (original) The catheter of claim 1, wherein the elongated shaft includes two or more radiopaque coatings, each radiopaque coating comprising a radiopaque material disposed within the non-metallic coating material that is applied to a surface of a portion of the shaft in a fluid state and cured.

10. (withdrawn) The catheter of claim 1, wherein the radiopaque coating is a first radiopaque coating, and the catheter further includes a second radiopaque coating;

the expandable member includes a proximal end and a distal end; and

the first radiopaque coating is disposed proximate the proximal end of the expandable member, and the second radiopaque coating is disposed proximate the distal end of the expandable member.

11. (withdrawn) The catheter of claim 10, wherein the radiopaque coatings define raised portions that extend radially from the elongated shaft and provide a surface area of adequate diameter for mounting a stent.

12. (original) The catheter of claim 1, wherein the radiopaque coating includes one or more separate segments of radiopaque coating disposed on the surface of the portion of the shaft.

13. (original) The catheter of claim 12, wherein the radiopaque coating includes in the range or 1 to 6 separate segments of radiopaque coating disposed on the surface of the portion of the shaft.

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14. (withdrawn) The catheter of claim 12, wherein the one or more segments are disposed in a helical arrangement about the shaft.

15. (original) The catheter of claim 12, wherein the one or more segments are disposed in a longitudinal arrangement along a longitudinal axis of the shaft.

16. (withdrawn) The catheter of claim 12, wherein the one or more segments are disposed in a grid arrangement

17. (original) A balloon catheter comprising:

an outer tubular member having a proximal end and a distal end, and defining at least one lumen;

an inner tubular member having a proximal end and a distal end, and including an outer surface and defining at least one lumen, the inner tubular member at least partially coaxially disposed within the lumen of the outer tubular member to form an inflation lumen there between;

an inflatable balloon having a proximal end sealably connected proximate the distal end of the outer tube, and a distal end sealably connected proximate the distal end of the inner tube, an interior of the balloon being in fluid communication with the inflation lumen; and

a radiopaque coating disposed on a portion of the surface of inner tubular member adjacent the inflatable balloon, the radiopaque coating comprising a radiopaque material disposed within a non-metallic coating material that is applied to the surface of the segment of the portion of the inner tubular member in a fluid state and cured.

18. (original) The balloon catheter of claim 17, wherein at least a portion of the radiopaque coating is disposed on a portion of the inner tubular member that extends through at least a portion of the inflatable balloon.

19. (withdrawn) The balloon catheter of claim 17, wherein the catheter includes two or more separate radiopaque coatings disposed on the surface of inner tubular member.

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20. (original) The balloon catheter of claim 17, wherein the radiopaque coating defines one or more raised portions that extend radially from the inner tube and provides a surface area of adequate diameter for mounting a stent.

21. (previously presented) A balloon catheter comprising:

an elongate outer tube having a lumen extending the length therein;

an elongate inner tube coaxially disposed within at least a portion of the elongate outer tube with a distal segment extending distally beyond a distal end of the elongate outer tube, the elongate inner tube having at least a portion being radiopaque by coating the portion of the inner tube with a non-metallic coating material loaded with a radiopaque material, where the non-metallic coating material is applied to the surface of the segment of the shaft in a fluid state and cured; and

an inflatable balloon having a proximal end, a distal end and an expandable region therebetween, wherein the distal end of the balloon is sealably connected to the distal segment of the elongate inner tube and the proximal end of the balloon is sealably connected to the elongate outer tube such that the expandable region of the balloon is in fluid communication with the lumen of the elongate outer tube, and

wherein the radiopaque portion of the inner tube is positioned adjacent the inflatable balloon.

22. (previously presented) A balloon catheter comprising:

a tubular member including a distal portion;

an expandable member affixed to the distal portion of the tubular member such that a portion of the tubular member extends through at least a portion of the expandable member; and

coating means for rendering a portion of the tubular member adjacent the expandable member identifiable under fluoroscopy, wherein the coating means is applied in a fluid state and cured.

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23. (previously presented) A balloon catheter comprising:
an elongated shaft including a distal portion and defining at least one lumen;
an expandable member affixed to the distal portion of the elongated shaft such that a section of the elongated shaft extends through at least a portion of the expandable member; and
a radiopaque portion disposed on a surface of a segment of the elongated shaft, the radiopaque portion comprising a radiopaque material disposed within a non-metallic material, the radiopaque portion defining one or more raised portions that extend radially from the elongated shaft and provide a surface area of adequate diameter for mounting a stent, the radiopaque portion applied to the surface of the segment of the shaft in a fluid state and cured.

24. (withdrawn) A balloon catheter produced by a process comprising:
providing an elongated shaft including a distal portion and defining at least one lumen;
applying a radiopaque coating in a fluid state to a surface of a portion of the elongated shaft, the radiopaque coating comprising a radiopaque material disposed within a non-metallic coating material;
allowing the radiopaque coating to cure; and
affixing an expandable member to the distal portion of the elongated shaft such that a section of the elongated shaft extends through at least a portion of the expandable member.

25. (withdrawn) A method of making a balloon catheter, the method comprising:
providing an elongated shaft including a distal portion and defining at least one lumen;
applying a radiopaque coating in a fluid state to a surface of a portion of the elongated shaft, the radiopaque coating comprising a radiopaque material disposed within a non-metallic coating material;
allowing the radiopaque coating to cure; and
affixing an expandable member to the distal portion of the elongated shaft such that a section of the elongated shaft extends through at least a portion of the expandable member.

26. (withdrawn) The method of claim 25, wherein the expandable member is affixed to the shaft adjacent the radiopaque coating.

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27. (withdrawn) The method of claim 25, wherein the non-metallic coating material comprises paint, lacquer, varnish, shellac, or resin.

28. (withdrawn) The method of claim 25, wherein the non-metallic coating material comprises non-metallic polymer coating material loaded with the radiopaque material.

29. (withdrawn) The method of claim 25, wherein the non-metallic coating material comprises a coating material that can be cured through photoinitiated polymerization, and allowing the radiopaque coating to cure includes curing the coating material through photoinitiated polymerization.

30. (withdrawn) The method of claim 25, wherein applying a radiopaque coating includes applying a sufficient amount of the radiopaque coating to the surface such that upon curing, the coating provides one or more raised portions that extend radially from the outer surface of the elongated shaft to provide one or more mounting structures for use in mounting a stent to the catheter.

31. (withdrawn) The method of claim 25, wherein the radiopaque coating extends through at least a portion of the expandable member.

32. (withdrawn) The method of claim 25, wherein the entire radiopaque coating is disposed within the expandable member.

33. (withdrawn) The method of claim 25, wherein two or more radiopaque coatings are applied to the elongated shaft, each radiopaque coating comprising a radiopaque material disposed within the non-metallic coating material that is applied to a surface of a portion of the shaft in a fluid state and allowed to cured.

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34. (withdrawn) The method of claim 25, wherein applying a radiopaque coating includes applying the radiopaque coating in one or more separate segments on the surface of the portion of the shaft.

35. (withdrawn) The method of claim 34, wherein applying a radiopaque coating includes applying in the range of 1 to 6 separate segments of radiopaque coating on the surface of the portion of the shaft.

36. (withdrawn) The method of claim 34, wherein applying a radiopaque coating includes applying the one or more segments in a helical arrangement about the shaft.

37. (withdrawn) The method of claim 34, wherein the one or more segments are applied in a longitudinal arrangement along a longitudinal axis of the shaft.

38. (withdrawn) The method of claim 34, wherein the one or more segments are applied in a grid arrangement onto the shaft.

39. (withdrawn) A method of making a balloon catheter, the method comprising:
providing an outer tube having a proximal end and a distal end with a lumen extending there through;

forming an inner tube having a proximal end and a distal end with a lumen extending there through, wherein the inner tube includes a radiopaque portion comprising a radiopaque material disposed in a non-metallic carrier;

disposing at least a portion of the inner tube within at least a portion of the outer tube such that at least a portions of the tubes are in a coaxial arrangement and define an inflation lumen there between; and

affixing an inflatable balloon proximate the distal end of the outer tube, and proximate the distal end of the inner tube such that the radiopaque portion is adjacent the balloon, and the interior of the balloon is in fluid communication with the inflation lumen.

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40. (withdrawn) A method of making a balloon catheter, the method comprising:
providing an elongated shaft including a distal portion and defining at least one lumen;
providing the elongates shaft with a radiopaque portion disposed on a surface of a segment of the elongated shaft, the radiopaque portion comprising a radiopaque material disposed within a non-metallic material, the radiopaque portion defining one or more raised portions that extend radially from the elongated shaft and provide a surface area of adequate diameter for mounting a stent; and
affixing an expandable member to the distal portion of the elongated shaft such that a section of the elongated shaft extends through at least a portion of the expandable member.